Zero Retries issue 0159 2024-07-05

Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with 1800+ subscribers. Radios are computers - with antennas!

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

In this issue:

- **Request To Send**
- **ZR > BEACON**
  - **Looking for HF-forwarding packet nodes to extend RF-only network in USA**
  - **HamCon:Zion 2024 Conference - 2024-07-12 and 13 in St. George, Utah**
  - **New AREDN Production Release Available - 3.24.6.0**
  - **2024 ARRL/TAPR Digital Communications Conference (DCC) Sept. 20-21, Knoxville, Tennessee**
  - **2024 AMSAT Space Symposium and Annual General Meeting – October 25th thru 27th, 2024**
  - **Heathkit was Acquired… And Relocated… and No One Noticed**
  - **M17 Experimental Authentication Signatures**
  - **Connect Systems M17 Project Status 2024-07-04**
  - **M17 Data Modes**
  - **Arduino Digital Transceiver (ADX) Buildathon**
  - **TX Factor - Episode 31 (TXF031) - Bluetooth Radio and QO-100 Ground Station**
  - **ELEKITSORPARTS - the Most Zero Retries Interesting Amateur Radio Retailer**
- **Join the *Fun* on Amateur Radio**
- **Closing The Channel**

Web version of this issue - https://www.zeroretries.org/p/zero-retries-0159

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **Prefers to Remain Anonymous 35** for becoming a new Annual Paid Subscriber to Zero Retries this past week!

Approximately one year ago, at the request of a few dedicated readers who wanted to support Zero Retries financially, I activated payment options for Zero Retries. I include this in every issue of Zero Retries at the “ending boilerplate”:

> If you’d like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR: Zero Retries Administrivia - Activating Payment Options.

Some of those who began their paid subscriptions in June and July 2023 have renewed their paid subscriptions, including:

- **Founding Member 0000 - Steven Davidson K3FZT**
- **Founding Member 0002 - Chris Osburn KD7DVD**
- **Founding Member 0003 - Don Rotolo N2IRZ**
- Orv Beach W6BI (Annual)
- John Simmons NK0K (Annual)

- Hugh Vance KW5X (Annual)
- Prefers to Remain Anonymous 03 (Annual)

I am especially indebted to K3FZT for a formative conversation I had with him at Hamvention 2022 and his ongoing support and feedback on Zero Retries.

Financial support is a real vote of confidence for continuing to publish Zero Retries.

Subscribe now

Major Conference Countdowns

- **JARL Ham Fair 2024** in Tokyo, Japan on 2024-08-24 and 25, in 7 weeks!
- **Digital Communications Conference (DCC)** in Knoxville, Tennessee on 2024-09-20 and 21, in 11 weeks! The DCC will be held in conjunction with GNU Radio Conference 2024 (GRCon24).

See the Zero Retries Guide to Zero Retries Interesting Conferences for other *Zero Retries Interesting* events.

We're almost at the three year anniversary of Zero Retries - the 2nd Friday of July, and I'll have some reminiscing to do next week in Zero Retries 0160, with the start of Zero Retries' fourth year of publication.

But this has been a busy week on the personal / home front, with some travel and the US Independence Day holiday, thus I'm falling back on a favorite quote of mine from the television series Stargate SG-1, "The Serpent's Lair", by Col. Jack O'Neill. The context is that his team is on the cusp of beginning a "big project".:

Well, I suppose now is the time for me to say something profound.

[long pause]

Nothing comes to mind. Let's do it.

And today a trusted advisor to Zero Retries offered this advice:

If it gets to be a grind - might already be - take 2 weeks off. Nobody'd mind. Gotta keep yourself happy.

While I'd get a bit itchy if I didn't put out an issue of Zero Retries each week, Thank You for that grace, trusted advisor!

So please enjoy this "lite" version of Zero Retries with no heavy reading, only ZR > BEACON items.

73,

Steve N8GNJ

Leave a comment

Share

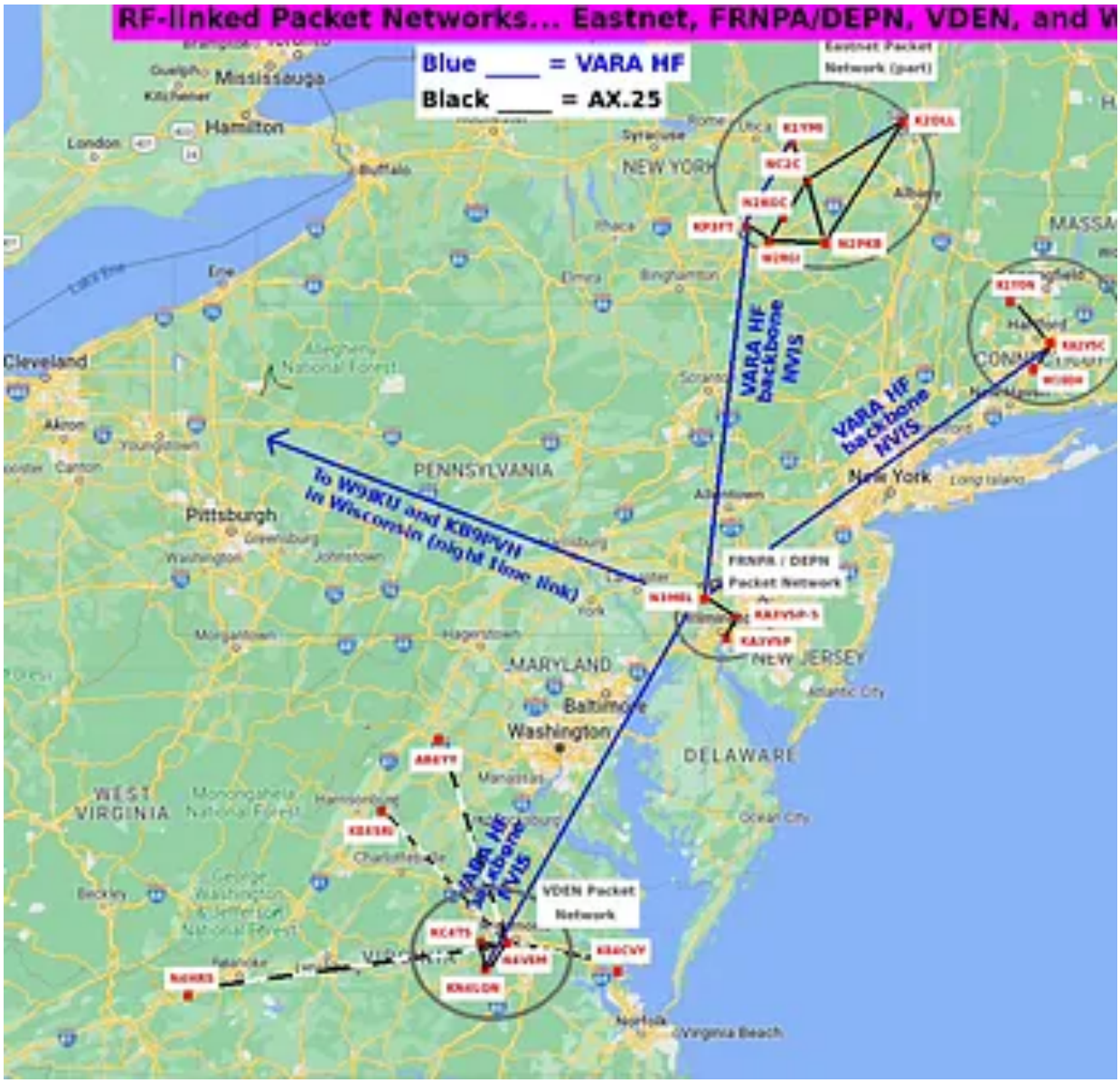
ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Looking for HF-forwarding packet nodes to extend RF-only network in USA

Jeff Mein KP3FT on Facebook Packet radio systems and information:



We're using VARA HF and ARDOP between NVIS-range stations. The conventional 300-baud AFSK mode isn't very good for HF links, which is why we're using VARA and ARDOP. Currently we have from NY to Virginia linked. NVIS range preferred for 24/7 links. We want to keep extending to every direction (except eastward over the ocean obviously). Map: https://www.qsl.net/swlkp3/Packet/(X)Net/NEnetwork6.png There's a Groups.io page dedicated to RF forwarding here: https://groups.io/g/Packet-Radio-RF-Forwarding The most common setup is a packet node using BPQ with a VARA HF port or ARDOP, with BBS mail forwarding set up to forward to a partner BBS using one of those modes. Other modes can be used as well, but VARA HF is easily the best performer (except probably the very expensive PACTOR mode).
Thanks, 73 Jeff KP3FT

In the early to middle stages of the “Packet Radio Revolution”, forwarding of Packet Radio Bulletin Board System (PBBS) traffic via HF was common… but problematic as the 300 baud Audio Frequency Shift Keying (AFSK) modulation and the AX.25 protocol was barely up to the task of getting messages back and forth over noisy, erratic HF frequencies. A single bit error in a packet would require resending the entire packet. In fact, it’s surprising this system worked at all. When access to the Internet became available for the general public, much of the PBBS traffic moved to the Internet… until PBBS usage fell to the point where PBBS sysops didn’t feel it was worth continuing to keep a PBBS online. But PBBS’ are seeing a resurgence, and we now have VARA HF which, in a phrase, “just works”, because it’s robust, adaptive, and offers higher data rates. For those that prefer not to use VARA HF, Amateur Radio Digital Open Protocol (ARDOP) is also an option. It’s notable that this network uses Near Vertical Incidence Skywave (NVIS) techniques to “restrict” the area covered to “regional” versus “worldwide” propagation. The G8BPQ BBS package has good integration with both VARA HF and ARDOP. Kudos to KP3FT and friends for getting the radio back into Amateur Radio Networking.

HamCon:Zion 2024 Conference - 2024-07-12 and 13 in St. George, Utah

Bill Buhler AF7SJ via email:

> The really cool part is that there are a lot of presentations that I believe will have a high level of appeal to Zero Retries readers:

- Digital Communications by "Bucky" Buckwalter W0SUN
- Mesh Networks by Frank Kostelac N7ZEV
- Winlink by Gary Hutton KE7UIA
- Ham Radio Homebrew by James Kretzschmar AE7AZ
- Using Attenuators by myself, Bill Buhler AF7SJ (I believe a vital part of good digital experimentation / station calibration).
- Build the Foundation & They Will Come by David Becar KI6OSS might be interesting.
- AI and Machine Learning in Ham Radio by Michelle Thompson W5NYV
- Arduino University Workshop by Jeff Anderson (requires additional fee and pre-registration)
- #APRSTHURSDAY by Mike DiTurno KC8OWL
- Starlink by Jeff Baxter KE7DYR
- Amateur Satellites by Ednaf Buckley N6UTC/MW1BQO & Patrick Stoddard WD9EWK / VA7E

There are several other presentation on things like the Icom 905, Yeasu System Fusion, and other more traditional ham radio topics.

For those not in the US, "Zion" refers to the nearby Zion National Park. Judging solely by the website, there seems to be an unusually high level of energy to HamCon:Zion! I agree with AF7SJ about a number of Zero Retries Interesting seminars, to which I would add *Icom 905 by Scott Honaker - N7SS - Icom*. This is the first time I've seen a seminar devoted to this radio; its unique capabilities are *worth* devoting a seminar session to. Had I known about this conference earlier, I might have made plans to travel and attend - the route from Bellingham to St. George looks like an interesting two-day drive. This conference is now on the Zero Retries Guide to Zero Retries Interesting Conferences.

If Zero Retries readers are aware of other "general" Amateur Radio conferences with a "reasonable number" of Zero Retries Interesting presentations, please let me know about them. ("Reasonable number" is entirely subjective, at your discretion from your reading of what subjects receive coverage in Zero Retries.)

New AREDN Production Release Available - 3.24.6.0

AREDN production software version 3.24.6.0 is now available, with many new features and enhancements. Besides a fix for an RF link issue that snuck past beta testing release 3.24.4.0, this release contains these fixes and enhancements:

Enhancements

- Added MTR support via installable package (mtr-nojson).
- Improved iPerf3 service to provide data line by line rather than at the end.
- Now use the closest supernode rather than first discovered supernode.
- Made LQM+OLSRD improvements where weak connections are detected.
- Now detect "leaf" nodes and prevent them being blocked.

New Device Support

- Antenna: Mikrotik 30 dBi 5° Dish
- Antenna: airMAX 2.4 GHz, 24 dBi 6.6° RocketDish
- Antenna: airMAX 3 GHz, 26 dBi 7° RocketDish
- Antenna: airMAX 3 GHz, 18 dBi, 120° Sector
- Antenna: airMAX 3 GHz, 12 dBi Omni
- Antenna: airMAX 5 GHz, 30 dBi 5.8° RocketDish Light Weight
- Antenna: Mikrotik 15 dBi 120° Sector
- Antenna: Mikrotik 19 dBi 120° Sector
- Antenna: Mikrotik 30 dBi 5° Dish (PA)

Plus numerous fixes and improvements. The energy and continuous improvement of the AREDN development team is really impressive. They continually demonstrate technological innovation within Amateur Radio!

If you want to learn about AREDN and experiment with (very local) Amateur Radio microwave networking, the easiest (in my opinion) and least expensive way to do so is with the GL-iNet products that are supported by AREDN.

2024 ARRL/TAPR Digital Communications Conference (DCC) Sept. 20-21, Knoxville, Tennessee

2024 ARRL/TAPR
Digital Communications Conference (DCC)
In association with GRCon24
Sept. 20-21
KNOXVILLE, TENNESSEE
Register now for the premier Amateur Radio Digital Communications Conference (DCC) featuring technical and introductory presentations and demos for everyone with an interest in digital communications – beginner to expert.
To register, visit www.tapr.org/shop

I saw this *terse* mention of this conference only in passing in the TAPR website RSS feed. "In association with GRCon24" refers to GNU Radio Conference 2024.

Editorial - I do wish TAPR would have the courage to drop the reference to ARRL from this conference. All management, scheduling, financial commitments, etc. are solely done by TAPR; ARRL has had nearly nothing to do with this conference for decades now other than some history, passive mentions of it in their publications, and "printing" the conference Proceedings of which I'm probably one of a dozen that actually purchase them.

2024 AMSAT Space Symposium and Annual General Meeting – October 25th thru 27th, 2024

> Doubletree by Hilton Tampa Rocky Point Waterfront
> 3050 N Rocky Point Drive West
> Tampa, FL 33607
>
> https://www.amsat.org/

I saw this *terse* mention of this conference in passing in the AMSAT News Service 182. Despite the inclusion of the AMSAT website link, at the moment there is no information about this conference available there (but ample details about the *2023* conference).

Heathkit was Acquired… And Relocated… and No One Noticed

I've been mildly curious about Heathkit since its "revival" early in the past decade and the "revival owners" idiosyncratic mysteriousness about not revealing the owners and other personnel of the company. Not much seems to change with "New Heathkit", so every few *years* I browse around to see if there are any new developments beyond their two primary products, a clock and an AM broadcast receiver. This year's browsing resulted in some actual news - from a LinkedIn post for Heathkit nearly a year ago:

> Kirkwall is pleased to announce its acquisition of Heath Company. Following the acquisition, William Cromarty will serve as Chief Executive Officer of both companies and will oversee a relocation of manufacturing operations to North Dakota as part of a planned expansion.

There is no mention of this acquisition (or relocation of facilities) on the Heathkit website or the Heathkit page on Facebook (last post 2020-01-01).

In the time since this announcement, this statement doesn't appear to have been realized:

> This expansion of operations in North Dakota will build on the impressive work of the Heath team in reestablishing the company as the premier educational electronics kit manufacturer, and allow our team to scale operations in preparation for new product launches.

I understand that all press releases are intended to be a bit over-the-top to get noticed, but… *premier educational electronics kit manufacturer???* That *was* true in Heathkit's *prime*, but that statement is *really* over-the-top considering New Heathkit's very modest product line compared to, for example, the electronic kits available from Velleman or Adafruit. But, I guess the press release served its purpose - it did get this mention.

M17 Experimental Authentication Signatures

The goal of the M17 Project is to create a digital voice / messaging / telemetry / data system for Amateur Radio VHF / UHF that does not use DVSI's proprietary digital voice CODEC. In mid-2024, "the pieces are in place" (in my opinion) that M17 can actually be used as a radio system. Documenting the usability of M17 in real world usage, such as this item and the following two items, is an ongoing project here in Zero Retries.

Apologies for how “fuzzy” this item is, but in the past couple of weeks I saw mention by Wojciech Kaczmarski SP5WWP that he was experimenting with adding authentication signatures to M17 transmissions.

~~Unfortunately, I cannot find the actual statement from SP5WWP (he posts his ideas in a variety of places). I recorded this link, but don’t see any detail there to support the above statement.~~

Update - *Found it (post publication)* - M17 Project on Mastodon:

> Finally some good news regarding digital signatures. I've been experimenting with ST's CMOX library and just got 160-bit ECDSA to run on the Module17. It takes around 8.25 ms to sign a 16-byte M17 voice stream digest. The signature can be appended to the voice stream. The curve used is Brainpool P-160 R1, with secp256r1 signing takes a tad under 15 ms.
> ^SP5WWP
>
> In the future, users might be able to generate ECDSA key pairs and use the private key for M17 stream signing. Then, by sharing the public component, allow the rest to perform identity checks. No more impersonation.
>
> Our protocol implementation has just been updated with experimental ECDSA signature support based on the secp256r1 curve. No signature verification has been added yet.
> https://github.com/M17-Project/M17_Implementations/tree/auth
> ^SP5WWP
>
> Implementing digital signatures in M17 - part 2. Looks like both encoder and decoder work together and the latter is able to verify stream signatures now.
> ^SP5WWP
> GitHub (`auth` and `crypto` branches are the most interesting):
> https://github.com/M17-Project/M17_Implementations

I *think* the idea is that in addition to the digitized voice or data and overhead data, an authenticated M17 transmission would interleave the data (or perhaps a separate payload) interleaved private key that can be authenticated with checking it against a person’s public key. This is a good example of the nature of an Open Source system, and the ability to extend it to experiment with new ideas that aren’t practical with “hardcoded” and commercially produced radios.

Update - *(post publication) email from SP5WWP:*

> [Your description is correct.] The signature occupies 4 last data frames of the stream. It is generated after the data transmission has finished. When there's no more user data to transmit, a hash based on all the contents is calculated. That hash value is then signed with the user's private key. The assumption here is that there would be a central, trusted public key directory (a database with callsign-key pairs). That would ideally be run by IARU or some other international organization. I'm aware that IARU does not have enough human resources to run this, tho.
>
> Key pair generation is trivial (under Linux CLI, it's a one-liner). An experimental (but already fully-functional, even with strong encryption) implementation is already available in our "M17_Implementations" repository ("main" branch).

Connect Systems M17 Project Status 2024-07-04

“Ongoing” communications like this are only accessible from signing up for the Connect Systems email list - there’s no web-based archive. Connect Systems is developing a pair of portable Amateur Radio units that will feature a native M17 mode - no reprogramming or modification needed. To my knowledge, these radios will be the first to feature a native M17 mode, and are hoped to be available in Summer, 2024.

Excerpt:

> There is something else to consider. If I buy the AnyTone, I just give them money and I get the radio With the M17 design, the company is paying for the development to implement the protocol in our radio. Then we will support for the CS7000 M17 PLUS for the development and implementation of the other protocols such as Fusion and DSTAR.
>
> Obviously the CS7000 M17 is costing us a lot more to buy but there is a reason. The CS7000 M17 is based on a commercial radio and the receiver is a double conversion superhet design with front end varactor tuning. That compares with the AnyTone which uses a single chip direct conversion receiver. The radio is also rated at IP-67 which means you can swim with it and not destroy it.
>
> **2. What is the status of your work and was is an approximately schedule for you to complete this part of the project.**
>
> The radio transmits and receives M17 without modulation or demodulation issues. I'm currently working on the radio driver in order to properly set up the missing parts, that are the bias voltage for the input filter and RF PA and some HR_C6000 configurations. It also seems that there is a bug somewhere that causes the radio to sometimes transmit only a carrier, but I didn't figure out yet where the problem is. I also brought up the driver to use the HR_C6000 as the audio DAC for the speaker, it needs some integration and final touches. The plan is to have a first alpha version of the firmware, with working M17 but still without settings' persistence, within two weeks: it all depends on how much time it's going to take working on the radio part, which implies a lot of reverse engineering of the CoValue firmware (and this takes really a lot of time). After this, I'll move on implementing the persistence, codeplug system and the remaining parts.

M17 Data Modes

I have not been able to be continuously engaged with the m17-users email list that I created, but my co-conspirators there have been keeping things interesting, such as this interesting post by Tony Langdon:

> M17 uses 4FSK modulation at 4800 baud (9600 bps). Last I knew, there were 3 modes defined:
>
> - Full rate voice (Codec2 3200). This is currently by far the most dominant format. However there’s still room for some ancillary data

like GNSS position. I believe this is a streaming mode.

- Half rate mixed voice/data (Codec2 1600 plus a data channel). Kind of like D-STAR's original mode. I'm not sure if this one is still officially defined.
- Packet mode. This is M17's data only mode.

Another interesting fact is M17 over KISS has been defined, which allows M17 frames to be sent to a TNC and transmitted. Obviously the TNC has to support 4FSK for the resulting transmission to actually be M17. The TNC4 is able to do this.

It's also possible to use packet mode to run AX.25 over M17.

This… is *really cool*. M17's data capabilities are something that I intend to dive deeply into. My thanks to Tony for explaining this so clearly - in my previous readings of the M17 Specification, I had not been able to find that level of detail / explanation about doing data over M17.

Arduino Digital Transceiver (ADX) Buildathon

Email from Clifford Heath VK2CLF:

You asked for Australian info. Manly Warringah Radio Society (VK2MB) is building the ADX (Arduino Digital Transceiver) and today was a big build day with the first units on-air. It's all documented on the club website:

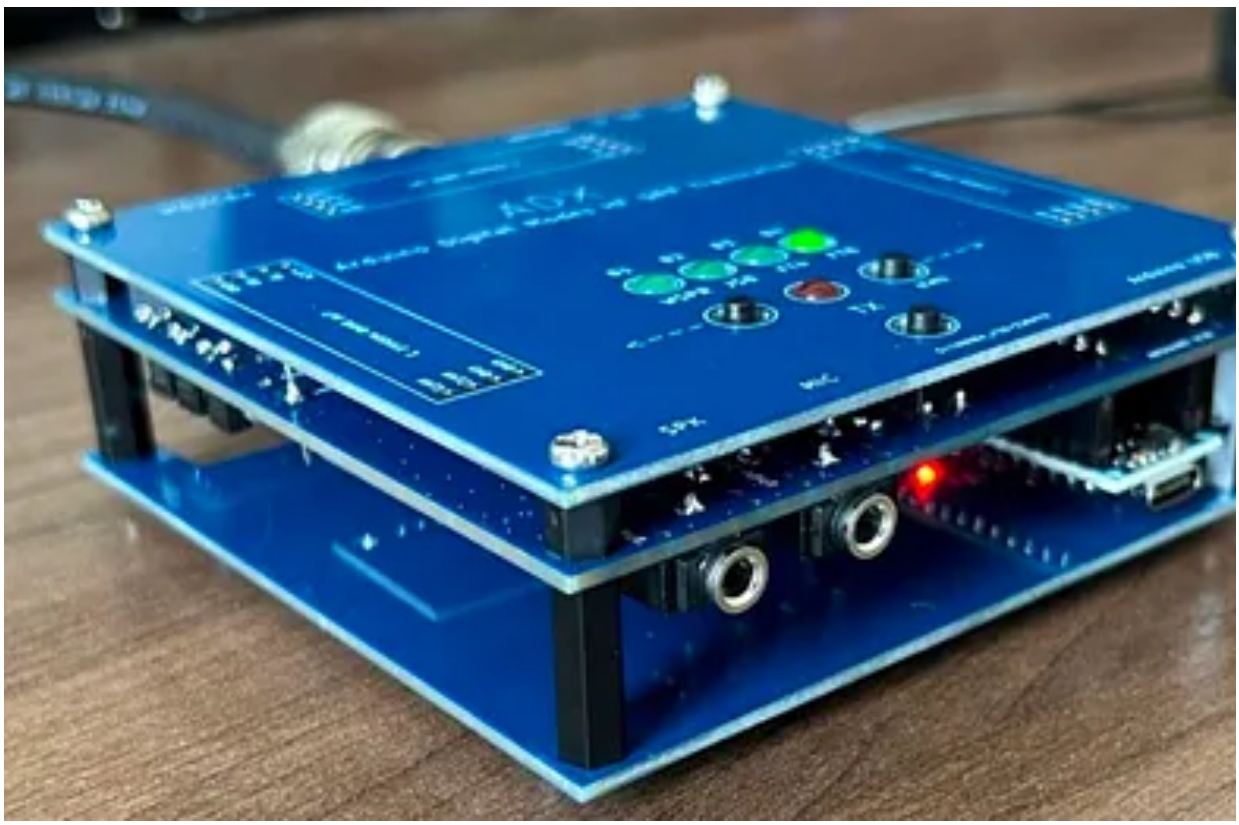


Image courtesy of the Manly-Warringah Radio Society

It all started with very good lecture by Richard Hinsley VK2ARH/W5ARH on the ADX (the Arduino Digital Transceiver) in April 2024 followed by an email to all from Michael VK2MDP asking around about interest for a club buildathon, very quickly the list of interested members grew to 28 people wishing to grab a kit, many to attend the 2 buildathon sessions, others either not local, not available or just wanted the challenge to try it on their own.

The ADX Buildathon workshop dates were:

- Wed 26-Jun-2024 – 7:30pm to 9:30pm Winding toroids for the low pass filters.
- Sat 29-Jun-2024 – 9:00am to 5pm ADX Build and Testing … and mandatory BBQ.

This buildathon of the ADX (link, *I think*…) by the Manly-Warringah Radio Society (Terrey Hills ~~Allambie Heights~~, New South Wales, Australia) is well-documented with many photographs of folks obviously having a good time with their builds, elbow to elbow.

TX Factor - Episode 31 (TXF031) - Bluetooth Radio and QO-100 Ground Station

Email from Zero Retries Pseudostaffer Jeff Davis KE9V:

I was just watching the latest edition of TX-Factor that was out new yesterday (TXF031). It includes the 2nd half of the QO-100 groundstation, but perhaps even more ZR relevant was as review of the new Anytone BT01 bluetooth "microphone" for the Anytone 578 DMR transceiver. The video can explain much better than I can type it up but basically, it's a useful accessory that permits the mobile style radio to have remote access (via BT) which works well since that transceiver doesn't have a detachable head.

I can see where this would be very useful and I imagine a lot of ZR readers are into DMR.

I jumped into this a video on KE9V's recommendation and it's pretty engaging. The Anytone BT-01 is a pretty cool item, which I first wrote about in Zero Retries 0065. It's just one of several Bluetooth "remotes" for Amateur Radio units, and it would be cool if someone was able to reverse engineer the Bluetooth protocol and create an open source equivalent. Also, the Anytone 578 is also capable of FM, so if the BT-01 is a major usability improvement, and you don't have any DMR repeaters in range (or don't care for DMR operation), it might still be worth investing in an Anytone 578. The last part of the video is also pretty engaging, operating on the QO-100 geostationary Amateur Radio payload accessible from most of the Eastern Hemisphere using the DXPatrol Full Duplex Groundstation V2.0.

ELEKITSORPARTS - the Most Zero Retries Interesting Amateur Radio Retailer

A correspondent [in the US] remarked recently:

> Sometimes I wish I lived in Europe ... everything good in the ham radio world is "over" there now, not here.

I replied with a link to ELEKITSORPARTS, which I've been a fan of since they became the first to offer a plug and play New Packet Radio unit. Their unique product mix for Amateur Radio exemplifies what my correspondent was saying. I have no idea where ELEKITSORPARTS is located in Europe; I've never been able to find a clue on their website.

ELEKITSORPARTS keeps featuring *new* Zero Retries Interesting units, most recently the *New* digiPi HAT. Just as an example, here are some Zero Retries Interesting radio options:

- RadioBerry V2.0 SDR Board
- RX-888 MK2 HF/VHF/UHF Software Defined Radio
- SDR Plus 70M-6GHZ
- Q900 SDR Radio Transceiver V4
- Trx-Duo SDR Transceiver

ELEKITSORPARTS is pretty close to my ideal of a *21st century* Amateur Radio retailer. If we could combine that with a Raspberry Pi retailer for one shop stopping for computer and radio hardware… that would be fantastic.

Leave a comment

Share

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- ***Founding Members*** **who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT (Renewed 2024)

  Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2024)
  Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2024)

  Founding Member 0004 - William Arcand W1WRA
  Founding Member 0005 - Ben Kuhn KU0HN
  Founding Member 0006 - Todd Willey KQ4FID
  Founding Member 0007 - Merik Karman VK2MKZ
  Founding Member 0008 - Prefers to Remain Anonymous 14
  Founding Member 0009 - Prefers to Remain Anonymous 19
- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org
- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories that often feature "Zero Retires Interesting" topics.
- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.
- TAPR Packet Status Register has been published continuously since 1982.
- Hot Iron - The Journal of the Constructor's Club is a delightful quarterly newsletter.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA
- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)
- Modern Ham by Billy Penley KN4MKB
- Tech Minds by Matthew Miller M0DQW

These podcasts regularly feature Zero Retries Interesting content:

- Ham Radio Workbench by George Zafiropoulos KJ6VU (and friends)
- Foundations of Amateur Radio by Onno Benschop VK6FLAB

Zero Retries is currently using the Substack email publishing platform to publish Zero Retries. It's particularly suitable for small newsletters as you can get started for no cost.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ***1800+*** other subscribers:

Subscribe now

Please tell your co-conspirators about Zero Retries — just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy — just click:

Leave a comment

If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Social Media:

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Zero Retries (N8GNJ) is also on Bluesky — @n8gnj — just click:

Zero Retries / N8GNJ on Bluesky

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

2024-07-05

Blanket permission is granted for TAPR to use any Steve Stroh content in Zero Retries for the TAPR Packet Status Register (PSR) newsletter (I owe them from way back).

Blanket permission is granted for *Amateur Radio use* of any Steve Stroh content in Zero Retries for Amateur Radio newsletters and distribution via Amateur Radio such as (but not limited to) Packet Radio Networks, Packet Radio Bulletin Board Systems, Repeater Nets, etc.

In such usage, please provide appropriate authorship credit for the content.

If you'd like to republish an article in this issue for other uses, just ask.

All excerpts from other authors or organizations, including images, are intended to be fair use. *Unless otherwise noted in the article*, there are no paid promotional items in any Zero Retries articles.

Portions Copyright © 2021, 2022, 2023, and 2024 by Steven K. Stroh.